

FLIGHT

The
**AIRCRAFT
ENGINEER
&
AIRSHIPS**

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

| | |
|---------------|----------------------------------------------------------------------------------------------|
| Sept. 17 | Royal Aero Club Race Meeting, Waddon Aerodrome, Croydon |
| Sept. 18 | Gordon Bennett Balloon Race, Brussels |
| Oct. 1 | Coupe Deutsch de la Meurthe |
| Oct. 22-30 | Aero Exhibition, Prague |
| Nov. 3 | Lecture, "Manœuvres of Getting Off and Landing," by Sq. Ldr. R. M. Hill, before R.Ae.S. |
| Nov. 12-27 | Paris Aero Salon |
| Nov. 15-26 | International Air Navigation Congress (Paris) |
| Nov. 17 | Lecture, "Requirements and Difficulties of Air Transport," by Col. F. Searle, before R.Ae.S. |
| Dec. 1 | Lecture, "Design of a Commercial Aeroplane," by Capt. G. de Havilland, before R.Ae.S. |
| Dec. 15 | Lecture, "Development of the Fighting Aeroplane," by Capt. F. M. Green, before R.Ae.S. |
| 1922. | |
| Jan. 5 | Lecture, "Specialised Aircraft," by Wing-Com. W. D. Beatty, before R.Ae.S. |
| Jan. 19 | Lecture, "Aeroplane Installation," by Brig.-Gen. R. K. Bagnall-Wild, before R.Ae.S. |

EDITORIAL COMMENT



VIDENTLY the United States aviation authorities do not intend to be discouraged from following the path mapped out simply because of the disaster which overtook "R.38" a month ago. So far from having lost faith in the rigid airship, it is understood that a demand is to be made

upon the British Government to replace the lost ship by one of the other rigids—possibly a surrendered Zeppelin—which are in our possession. We trust this is so. Not that we do not want to see the Government deal with these craft to the best advantage, but, it being now fairly obvious that we shall never see the existing ships commissioned under the British mercantile flag, we are strongly of opinion that if one or more could become an example of how airships can be used by others it would ultimately turn out to be a good thing for British aviation. Not the least significant aspect of the matter is that the United States seems to be at one with Germany, which pioneered the rigid type, in believing in the possibilities of lighter-than-air craft. We, who have had more experience of the type than any other country, with the exception of Germany, do not seem to have the courage of our experience, and it would seem to need the example of successful operation by other countries to revive the interest in airships. That they can be successfully operated we are most fully convinced. Whether our existing types are suitable for commercial purposes may be open to question. Our own opinion is that they would be extremely useful for experimental services on the Empire air routes, but that they are all that is desirable commercially is probably untrue. Sooner or later, probably sooner, they would have to be replaced by improved types, as the Germans are preparing to do as soon as the embargo of the Peace Treaty is lifted. As we are apparently not going to use the ships for ourselves, the next best thing is to let the Americans have what they apparently want, and to see how their experiments work out. It is somewhat humiliating after all the money that has been sunk in research work, and in the development of the airship, that we should have to look to others to carry on the experiments for us, but so it seems to be.

The U.S.
and the
Airship

Cheaper Production Essential

At the opening of the Shipping, Engineering and Machinery Exhibition at Olympia last week, Sir Trevor Dawson made a most interesting and illuminating speech on his recent experiences in Germany. He first of all touched upon the subject of aviation, particularly with reference to the loss of "R.38." The lives of those who died in this disaster, he said, would not have been given in vain, because the lessons we should learn from their pioneer work might yet be of great value to that part of commerce and shipping associated with commercial air transport. To ensure continued development of commercial aviation the nation must recognise that failures are due to incidental and not to fundamental causes. All great departures in science had involved disaster in their earlier stages—shipping, railways, electricity, to name but three—yet success and security were attained; and so it would be with aviation. We need scarcely remark that we are most completely in accord with these views. Indeed, they are absolutely on all fours with what we wrote on the subject when the disaster to the giant airship was still fresh in people's minds.

Coming to the subject of his visit to Germany, Sir Trevor said that the engineering and electrical works he visited were veritable hives of industry, labour appearing to be working harmoniously and output was very high. At an electrical works he asked to what extent they had been able to write down their shops and machinery during the War, and the reply he received was that they stood in the books at one mark! He was further informed that, during the War, there were no taxes such as the munitions levy or the excess profits duty, and that consequently industry had been able to collect working capital to enable it to progress with peace production without any financial embarrassments. Industry was thus put in an excellent economic position to compete successfully in the markets of the world.

The main conclusion to be reached is that Germany is working hard, under comparatively easy financial conditions, to get back to her pre-War industrial and commercial position. Capital has been unembarrassed by extortionate taxation, while labour has grasped the fact that the one and only way to wealth and prosperity lies through hard work. In England the community works for four months of the year to pay the tax-collector. Labour has been induced by a few extremist hot-heads to believe that wealth is represented by a heap of money in the hands of a privileged few, and that it is only necessary to strike hard enough and often in order that everybody may get his fingers deeply into the pile. Germany is working, while we are still slacking, though it is but fair to say that a new outlook seems to be dawning, and the future thus appears a little more hopeful than it did a few months ago. Production and yet more production is what we require to set us on our feet again. We are told that we suffer from over-production, and that all the talk about increase of output is wrong. So it is, if we cannot produce at a price which will allow our goods to compete in the markets of the world. But if individual production is increased to the point at which we can compete, then our salvation as a commercial and industrial nation is assured.

N.C.O. Pilots Again

An Air Ministry order has been issued, reverting to the system whereby non-commissioned officers can qualify and be employed as pilots in the Royal Air Force. During the War, for reasons which were then deemed sufficient, the privilege was withdrawn from the non-commissioned ranks and only commissioned officers were employed as pilots. Why this fresh change has been made we do not know, and are rather inclined to doubt its wisdom. Not that we would desire to suggest for a moment that, simply because a man does not hold a commission, he will not make a good pilot. On the contrary, there must be many N.C.O.s who have the making of extremely good pilots, and they most certainly ought to be given the chance to show what they can do. Of course, this is a Service matter on which the outsider possibly has little or no right to express a decided opinion, but it seems a little questionable whether the best interests of the Air Force are likely to be served by having two classes of pilots, commissioned and non-commissioned, the duties of both in case of war being identical. It looks rather as though it could be argued that, for instance, Flight-Sergeant Smith may be an altogether good pilot but that socially he is not good enough to be given entry to the commissioned ranks. For the sake of the *esprit de corps* of the Force it would be a pity if any such feeling got abroad, and we suggest that it would be far better if it were laid down that selected non-commissioned officers should be allowed to qualify as pilots, and that immediately upon qualification they should be given commissioned rank.

It may be that there is some good purpose behind the new move, and that we are wrong in our impressions. Still, the matter strikes us as we have outlined, and we shall be rather surprised if that is not the way it will be regarded within the Air Force itself.

The Air Taxi Becoming a Common- place

Although commercial aviation is not progressing as fast as we should like, particularly in the establishment of regular lines and services, there can be no doubt at all about its catching on with the business community. The air "taxi" is becoming quite a commonplace method of conveyance, and we understand that those pilots who have had the courage to invest in their own machines and to "ply for hire" at the principal aerodromes have no reason to complain of lack of patronage. As a matter of fact, those at least who use the aerodromes at Croydon and Edgware are being kept quite busily employed, mainly on urgent cross-Channel flights. The busy man of affairs who has business in France, and finds he can just spare a few hours to attend to it, now rings up the transport company concerned, orders an air taxi to be ready at a particular time, and goes about his journey quite as a matter of course. Nor is it really a costly journey, especially when the immense saving of time over any other means of transport is taken into account. The charges, as a matter of fact, work out at about 1s. per mile per person, which is really very moderate indeed.

Not only is it worth the while of the business man to travel by air on account of the saving in time, but he is saved all the trouble of making connections with train and boat. Having engaged his machine, he knows absolutely that it will be ready to leave



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LONDON-PARIS, FROM THE AIR, AS SEEN FROM A HANDLEY PAGE MACHINE :
No. 9.—Upper photo. : Herne Hill and District. Lower photo. : Kennington District.

at the time he says, and he has nothing to do but to motor out to the aerodrome, secure in that knowledge. Less than three hours after he has left his office he will be landed at Le Bourget, where a car will meet him and whisk him into Paris itself. His methods of travel from door to door are, so to say, personal to himself. He can leave London when he wants, depending upon nothing but his personal desire in the matter of time, and he can return immediately his business is completed without

having to fit his arrangements in with train schedules. This wonderful elasticity of air travel is one of its greatest assets, and as that becomes more and more realised by the business community the growth of the air taxi business will be correspondingly rapid. It is very satisfactory to know that matters are progressing as well as they are, though we are, of course, still a very long way from achieving the rapid development we had hoped for after the end of the War.

The New Dayton-Wright Wing

IN relation to a paragraph which appeared in our issue of August 11, 1921, we have received from the Dayton-Wright Co., of Dayton, Ohio, U.S.A., some brief particulars relating to the aerodynamic results obtained. It is pointed out that there is very little resemblance between the new wing and that fitted to the R.B. mono. which took part in the Gordon-Bennett last year. The former wing had both trailing and leading edges hinged, while, as stated in our paragraph, the new wing is split horizontally over the entire trailing edge. The upper half of it remains in place, as in an ordinary section, but the lower half can be pulled down by suitable mechanism. We stated in our previous reference that it was difficult to see why such an arrangement should give a great increase in lift, as it would appear to act mainly as an air brake.

However, we now learn from the makers that the results obtained are very good, not only as regards the increase in lift, but also from the point of view of a fairly good L/D ratio at the angle of maximum lift. Thus a section which, normally, has an L_c max. of .0032 (0.627 "absolute") had its maximum L_c increased to .0050 (0.98 "absolute") when the flap was pulled down to 45 degs. with the chord. The L/D corresponding to this lift is 4.2, which is certainly very good. It would therefore appear that the new Wright-Dayton wing offers good possibilities, especially as the operating mechanism required should offer no great problems, either as regard weight or mechanical complications. With ordinary hinged flaps the movement of the c.p. is sometimes found to be considerable, but we do not know how this is affected in the Dayton-Wright.

THE LONDON-CONTINENTAL SERVICES
FLIGHTS BETWEEN SEPTEMBER 4 AND SEPTEMBER 10, INCLUSIVE

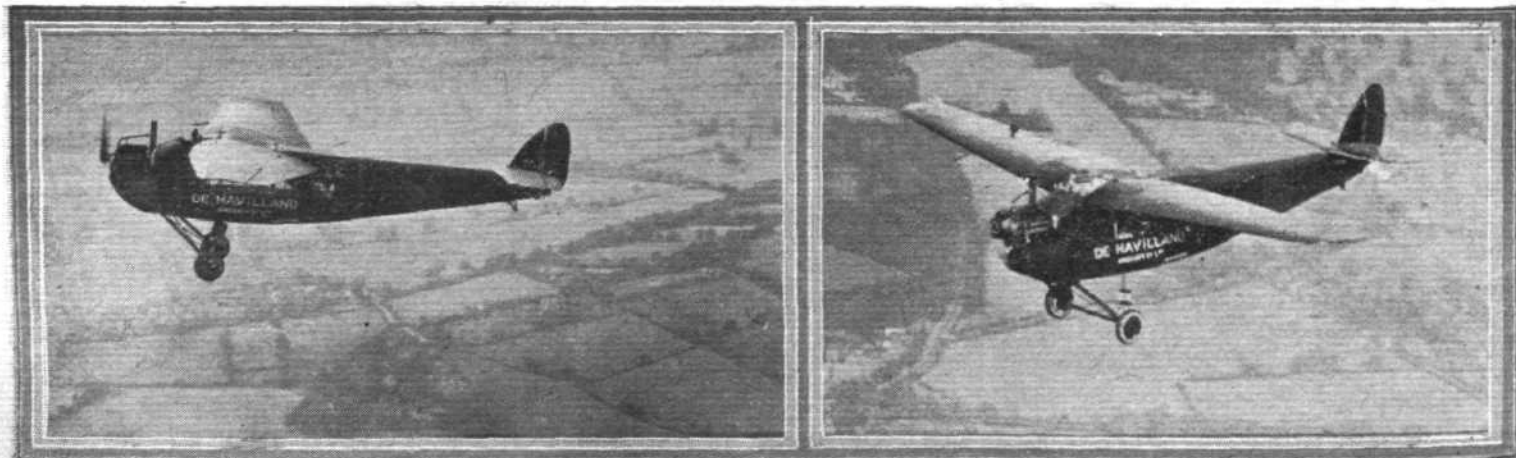
| Route† | No. of flights* | No. of passengers | No. of flights carrying | | No. of journeys completed† | Average flying time | Fastest time made by | Type and (in brackets) Number of each type flying |
|-----------------------|-----------------|-------------------|-------------------------|-------|----------------------------|---------------------|-----------------------------|------------------------------------------------------------------------------|
| | | | Mails | Goods | | | | |
| Croydon-Paris ... | 38 | 151 | 11 | 24 | 34 | h. m. 2 58 | D.H.4 G-EAMU (2h. 19m.) | B. (7), D.H.4 (1), D.H.9 (1), D.H.18 (2), G. (5), H.P. (3), Sp. (6), V. (1). |
| Paris-Croydon ... | 36 | 155 | 16 | 29 | 36 | 2 53 | D.H.18 G-EAWO (2h. 5m.) | B. (5), D.H.4 (1), D.H.9 (1), D.H.18 (2), G. (5), H.P. (3), Sp. (6), V. (1). |
| Croydon-Brussels ... | 9 | 17 | 6 | 5 | 8 | 3 14 | D.H.4 O-BARI (2h. 17m.) ... | D.H.4 (4), G. (1) |
| Brussels-Croydon ... | 12 | 18 | 7 | 7 | 10 | 2 40 | D.H.4 O-BARI (2h. 10m.) ... | D.H.4 (4), G. (1), W. (1). |
| Croydon-Amsterdam ... | 6 | 3 | 6 | 6 | 5 | 3 28 | Fokker H-NABJ (3h. 3m.) ... | F. (4). |
| Amsterdam-Croydon ... | 6 | 9 | 6 | 6 | 5 | 3 23 | Fokker H-NABJ (3h. 7m.) ... | F. (3). |
| Totals for week ... | 107 | 353 | 52 | 77 | 98 | | | |

* Not including "private" flights.

† Including certain journeys when stops were made en route.

‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez. Sa. = Salmson. Se. = S.E. 5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.



THE NEW DE HAVILLAND MONOPLANE: Two views of the machine in flight. The photographs are published by permission of the Air Ministry, but no technical details may be given.

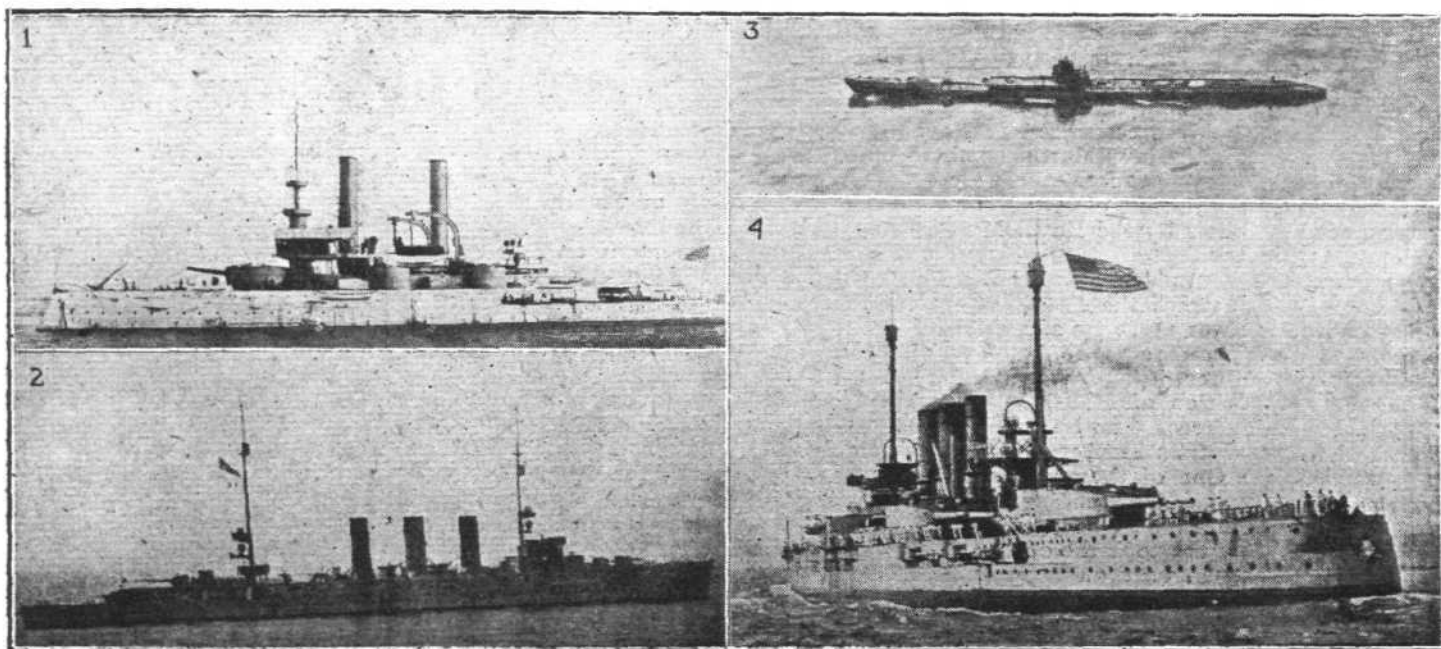
THE U.S. AERIAL BOMBING EXPERIMENTS ON WARSHIPS

THE following particulars of the aerial bombing experiments on various types of warships carried out recently by the U.S. Government may be of interest to readers of *FLIGHT*. It is to be regretted that the information at our disposal is somewhat incomplete, so that it is difficult to form any definite conclusions from the results of these tests—only in one or two cases, for example, do we know the altitude from which the bombs were dropped. Even allowing for our lack of details, however, we cannot say that we are particularly impressed with these tests—as tests. For instance, it must be remembered that except in the case of the *Iowa*, the targets were at anchor, or adrift, and were attacked, as far as we can ascertain, at comparatively close range—at between 1,000–3,000 ft., where, we should think, it would not have been very pleasant for the aircraft under actual War conditions!

The first of the series of tests took place on June 21, off the Virginia Capes, when the surrendered German submarine "U. 117" was attacked, and eventually sunk, by a Naval division of F-5-L flying boats (three machines). Several other divisions, Naval and Army, of F-5-L and N.C. flying boats, Glenn Martin bombers, and D.H. 4 machines, were also to have attacked, but the submarine was sunk before their turn came. At 9 a.m. the three F-5-L flying boats, under Lieut. D. Thomas, took off from Hampton Roads

by the Army airship D. 2, which spotted the *Iowa* and its consort of ships about 65 miles off Cape Henry and wirelessly the report to the U.S.S. *Shawmut*, the flagship of the air forces. This message was intercepted by one of the F-5-L flying boats, and relayed to the *Shawmut*, and shortly after the first of the attacking machines appeared over the target. Nine F-5-L and one N.C. flying boats, five Martin bombers, and five D.H. 4's took part in the thirty-five aerial attacks. On several occasions the pilots had to hold their fire due to the changes in the course and speed of the *Iowa*. The F-5-L's attacked singly, flying in single file over the moving *Iowa* directly into the wind until their four 163-lb. bombs had been released, and the N.C. boat dropped her four 500-lb. bombs singly, without, however, making a direct hit. The five D.H. 4's also flew in single formation, and dropped two 230-lb. bombs each. The last attack of the day was made by the Martin bombers, each carrying two 1,000-lb. bombs. They flew in excellent formation, and their final salvo made quite an "artistic" pattern around the *Iowa*. It is reported that altogether only two direct hits were made, each being on the forecastle of the *Iowa*. We have no further information on this test, which appears to us to be the most interesting of the series.

On July 13, the ex-German Destroyer "G. 102" was bombed and sunk by the Army Air Service, about 41 machines



THE U.S. AERIAL BOMBING TESTS ON WARSHIPS: Four of the vessels used in the tests. (1) Ex-U.S.S. "Iowa," which was controlled by wireless. (2) The ex-German armoured cruiser "Frankfurt." (3) The ex-German submarine "U.117." (4) The ex-German battleship "Ostfriesland."

and headed for the position of the submarine. About an hour later the division was sighted by the vessels of the Atlantic Fleet which were standing by the "U. 117."

A few minutes later the flying boats let go a first salvo of three 163 lb. Mark IV bombs, from an altitude of 1,000 ft. No direct hits were obtained, but one bomb fell close to the submarine on the port side, and the other two fell to starboard. The machines thereupon made a large circle and headed back upon the target, and then let go a second salvo of nine bombs. Two of these scored direct hits just aft of the conning tower, and the remaining eight bombs fell in close proximity of the target, which immediately began to settle. It sank by the bows in six minutes from being hit.

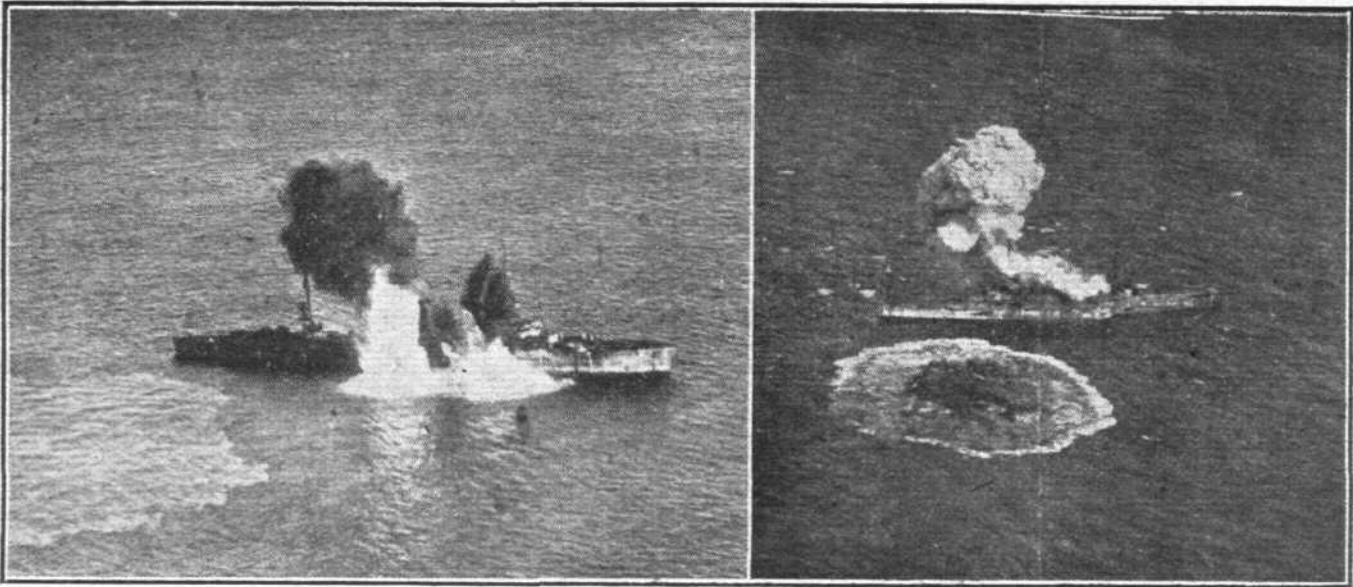
The next test (scheduled for June 28, but postponed on account of a thick haze), a "dummy" bombing attack on the radio-controlled ex-battleship U.S.S. *Iowa*, took place on June 29, also off Virginia Capes. The *Iowa* was under her own power, without pilot or crew, directed by radio from the U.S.S. *Ohio*. She was steaming at half speed, but during the bombing test the speed was varied by the operator on the *Ohio* between 3 and 9½ knots, which together with the various changes of course rendered the aim of the bombers more difficult.

Prior to the bombing test proper, the attacking aircraft had to determine the position of the *Iowa* in a possible area of 25,000 miles. This was accomplished within two hours

attacking. The G. 102 was adrift off the Virginia Capes, and the attacking machines used shore-bases at Langley Field and Hampton Roads. The aircraft employed consisted of 11 S.E. 5's, 14 D.H. 4B's, 14 Martin bombers, and 2 Caproni's, in addition to a few other machines for observation work, etc. The S.E. 5's made the first attack, and dropped about 40 25-lb. Cooper bombs, with the object of destroying or driving below deck the "personnel" of the destroyer, and preparing the way for the heavy bombers. They arrived in V formation at 1,000 ft., and then formed into single file and dived on to the target. About 50 per cent. of their bombs scored direct hits.

After this the D.H. 4's and the Martin bombers, carrying 300-lb. bombs, attached from about 3,000 ft., dropping between them 51 bombs. One of the D.H. machines obtained the first direct hit, and the destroyer commenced to sink by the bows immediately after. A second direct hit, from one of the Martins, struck amidships, and sent the destroyer to the bottom right away.

A somewhat severe test was carried out on July 18, when the ex-German Cruiser *Frankfurt* was bombed and sunk by Army and Navy Aircraft. The *Frankfurt*, which took part in the battle of Jutland and the Skuttle of Scapa Flow, was one of the later types of light cruisers, laid down in 1913. It had a normal displacement of about 5,100 tons, a speed of 28.5 knots, and the armament consisted of eight 5.9-in. guns,



THE U.S. AERIAL BOMBING TESTS ON WARSHIPS : The view on the left shows bombs hitting alongside the ex-German cruiser "Frankfurt," sunk on July 18. On the right is seen a direct hit by a 1,100-lb. bomb on the ex-German battleship "Ostfriesland," which was sunk later, by a 2,000-lb. bomb, on July 21.

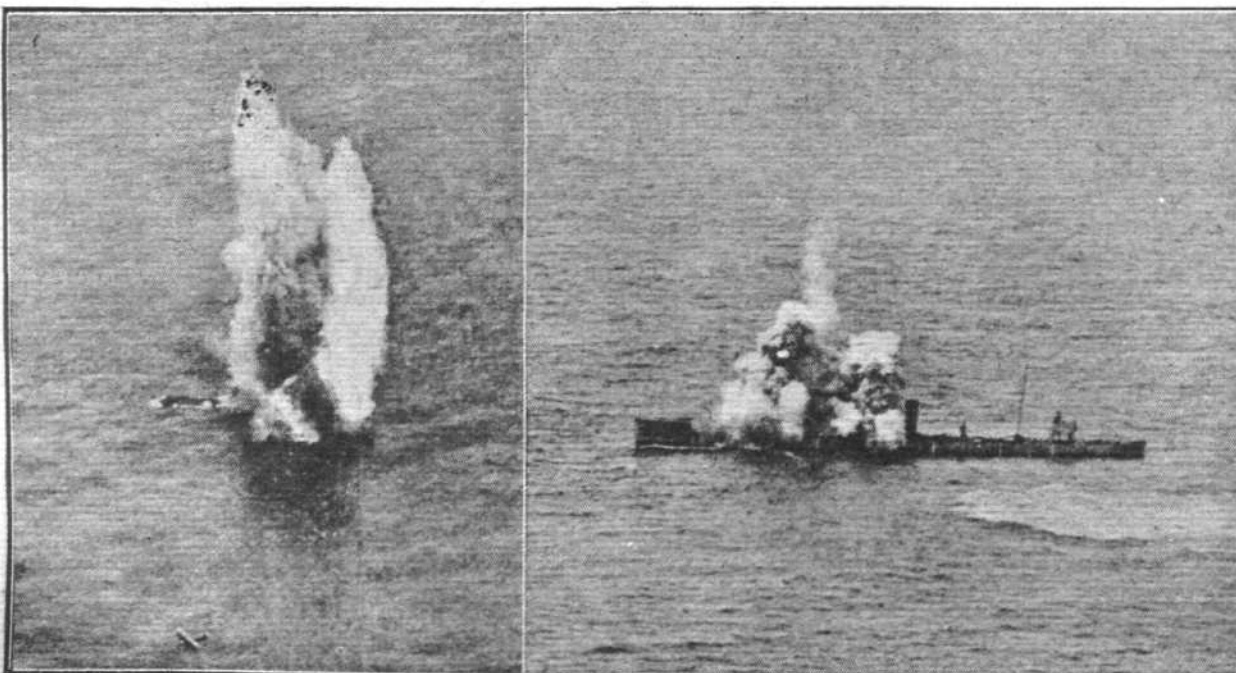
and two 19.7-in. torpedo tubes. Its armour protection consisted of a side belt, 5.9 ins., tapering to 3.9 ins. forward and 3 ins. aft., and a deck protection of 1.5 in. The tests were carried out in two phases, light bombing and heavy bombing, and the aircraft employed comprised 12 Naval F-5-L flying boats, and 15 Army and Navy Martin bombers. In the first phase, 54 bombs of 250-300 lbs. each were dropped, and in the second phase 24 bombs of 520 lbs. and 600 lbs. each were dropped, 10 520's by the Naval Martins, and 14 600's by Army Martins.

The first attack was made by six F-5-L's, which dropped 12 250's, one of which struck the *Frankfurt* abaft the foremast. The second attack was made by a division of Army Martin bombers, which dropped 12 300-lb. bombs, without, however, obtaining a single direct hit. A third attack was then made by the Second Division of Naval F-5-L's, which dropped 6 250-lb. bombs, and scored no hits. The fourth attack was made by an Army Martin bomber, from which were released six 300-lb. bombs. One of these struck the *Frankfurt* just behind the aft smokestack, sending much debris into the air. After this a halt for an hour was called, during which the air flagship *Shawmut* took the official observers on board the *Frankfurt* to report on the damage done. Their verdict was that while severe damage had been done to the deck and upper works, the hull seemed intact and no water had entered.

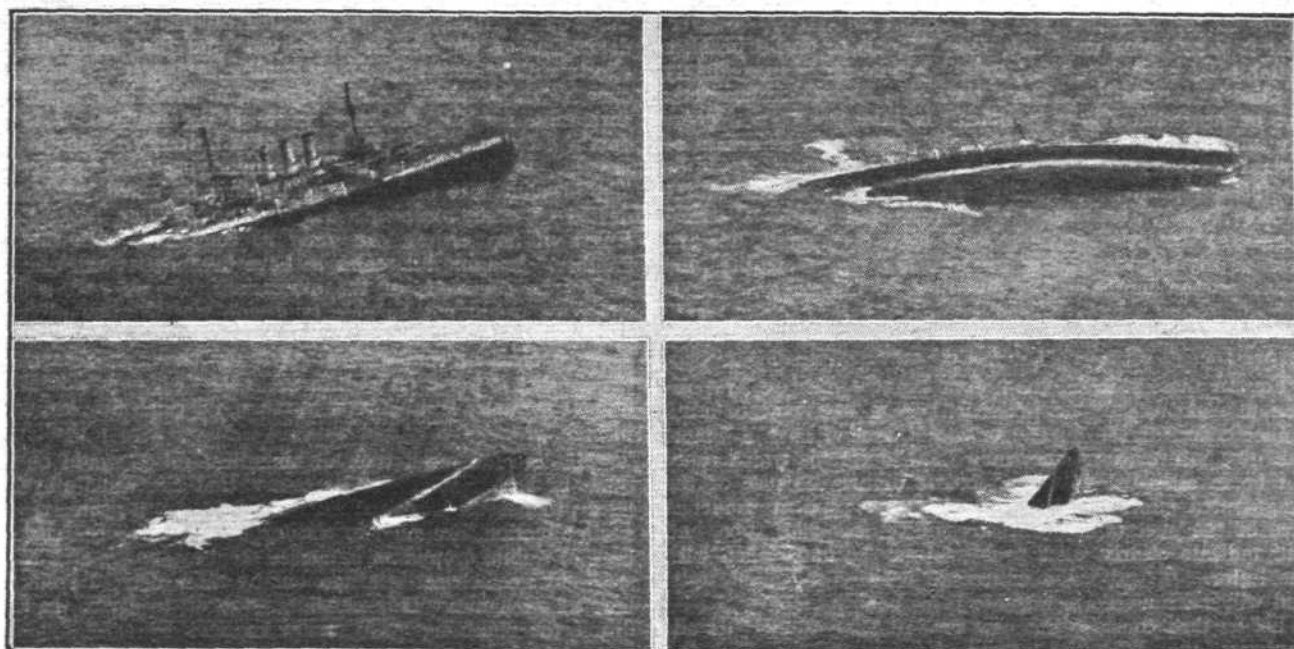
The bombing was then renewed, and the fifth attack was carried out by the 3 F-5-L's of the First Division, 6 250-lb. bombs being dropped, but without scoring a direct hit. Three Army Martins, which followed, dropped 12 300's,

also without scoring a hit. This concluded the light bombing tests, and a start was made with the heavy phase by the Seventh Division of Naval Martin bombers (3) which dropped 4 520-lb. bombs. The first of these hit between the first and second smokestacks, tearing up the armoured deck of the *Frankfurt*. Half an hour later the same machines dropped 6 more 520's, in two salvos, obtaining one more direct hit aft of the mainmast. When examined by the observers, the second of the hits was found to have gone down through the stern and come out of the hull above the waterline without doing much damage—it was apparently a "dud" bomb.

By this time, the *Frankfurt*, although somewhat badly battered, was still afloat, and plans were being made by the assembled fleet for her destruction by gunfire. While the observers were examining the effect of the bombs, an Army Division of 6 Martins arrived from Langley Field. As they only had sufficient fuel left to enable them to make the return trip, they signalled the *Shawmut* their wish to attack right away, so the observers withdrew, and the *Shawmut* then signalled to the Martins "Proceed to attack." Changing their V formation to single column, the machines began circling the *Frankfurt*, and dropped 14 of their 600-lb. bombs from 3,000 ft. Two of these landed amidships, and tore much of the superstructure away, and gave the ship a violent shaking, but left her still afloat. The bomb that actually sank the *Frankfurt*, shortly after, fell alongside just off the starboard bow, and when it exploded it lifted the hull several feet out of the water, two great spouts of water shooting up



The U.S. Aerial Bombing Tests on Warships : On the left, a direct hit on the submarine "U.117," which was sunk on June 21, and on the right two 300-lb. bombs exploding on the ex-German destroyer "G.102," sunk on July 13.



THE U.S. AERIAL BOMBING TESTS ON WARSHIPS : Four views showing how the "Ostfriesland" sank.

on either side of the bow. This bomb had apparently exploded almost directly under the forward keel, causing the starboard bow to break up, with the result that the compartments began to fill. Half an hour later she sank, stem first, before the observers could get on board to investigate the damage.

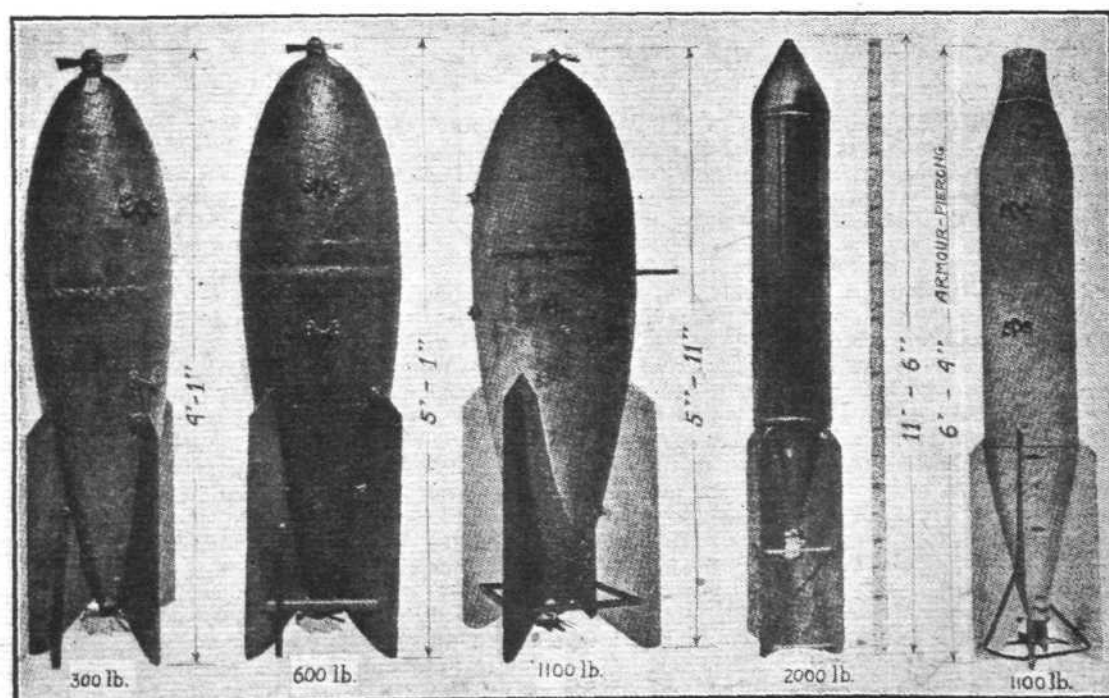
The "star turn" took place on July 21, when the ex-German battleship *Ostfriesland* was sunk by two 2,000-lb. bombs. The *Ostfriesland* was a 23,000-ton battleship, 546 ft. long by 93 ft. beam, with very strong armour protection—especially underwater. Side belt and turret protection was 12 ins., conning tower 13½ ins., and protective deck 3 ins. Bombing attacks were carried out on two days, July 20 and 21, 230-lb. and 600-lb. bombs being employed on the first day and 1,100-lb. and 2,000-lb. bombs on the second. Altogether 64 bombs were dropped, as follows: 230-lb. (41), 600-lb. (11), 1,100-lb. (5), 2,000-lb. (7). On the first day, 13 direct hits were obtained, out of which 9 were "duds," and on the second day, 4 were direct hits, one of which was a 2,000-lb. The other 2,000-lb. bombs all fell very close and did considerable underwater damage.

The first attack was opened by five Marine Corps D.H. 4's, which released nine 230-lb. bombs (in four salvos), one of which hit aft of the smokestacks, damaging the deck works. The Second Division of Naval F-5-L's followed and dropped

five 230's, scoring one more direct hit in about the same place. It was noticed shortly after that the *Ostfriesland* took a decided list to port, apparently as the result of the last direct hit. The Fourth Division of F-5-L's then attacked, releasing 11 more 230's with varying success. Observers then inspected the effect of the bombs, and reported that only local damage had been caused. The Army Martin bombers, which had been waiting overhead, then resumed the attack with 11 600-lb. bombs, an attempt being made on this occasion to place the bombs close in around the ship with the object of opening her seams by under-water explosions. Three bombs fell just off the bow, two off the stern, and one was a direct hit. A dozen 230's were also dropped by another Division of F-5-L's, the score being two direct hits and several close up. This concluded the first day's work, the result of which was considerable local damage, and, apparently, some seams had opened underwater, for the following morning the *Ostfriesland* had gone down 2 ft. by the stern.

On the second day the tests comprised two phases: An early morning attack by Army Martin bombers dropping 1,100-lb. bombs, and a midday attack by Army Martins, and a Handley Page, with 2,000-lb. bombs. Considerable damage to the superstructure was done in the morning attack, when three direct hits were scored out of five. The

The U.S. Aerial Bombing Tests on Warships: Types of bombs used, ranging from 300 lbs. to 2,000 lbs. That on the extreme right is a special 1,100-lb. armour-piercing bomb.



first hit was on the starboard side of the fore-castle deck, and a large hole was made in the side, the second and third direct hits fell on the starboard side near the off smokestack, doing considerable damage. The third hit broke away part of the after structure, just behind the third smokestack, and would have disabled the after fireroom had it been in boiler service. The other bombs all fell close to. It was the contention of the Naval Board that as these hits had not pierced the armoured deck, they could not do any damage to the steering gears, pumps, boilers, or machinery, so that water taken in could have been pumped out, and the ship might have been able to reach port.

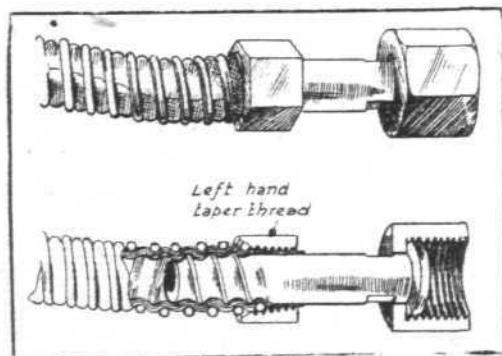
The second phase, or heavy bombing test, started shortly after midday, when the Martins and one Handley Page arrived from Langley Field, 97½ miles away. On reaching the target they changed from their V formation to column, and the leading machine dropped a small range-finding bomb which fell 150 ft. ahead of the ship. The next was a 2,000 lb. bomb which fell in the water close in on the starboard

bow, then followed another which fell 300 ft. ahead of the target. Another range-finding bomb was dropped by the next Martin, and then the following machine scored the first hit with its 2,000-lb. "pill," which struck the deck in the bow, tearing a great hole out of the starboard side of the fore-castle. The fourth 2,000 dropped by the next Martin went into the water close in on the port side abreast of the main-mast, and fairly lifted the ship upwards, but it was the following 2,000-lb. bomb that began to put the ship under. This fell in the water near the stern on the port quarter side. Immediately after, the *Ostfriesland* lifted her nose and began to sink by the stern. The two big guns in the after turret, which had been thrown out of alignment by one of the morning shots, disappeared after the bomb hit the water. The sixth bomb dropped by the last of the Martins struck the water less than 50 ft. from the stern, which was by then awash. Eight minutes later, the *Ostfriesland* rolled over on her port beam ends and slid down stern first to the bottom, the Handley Page giving a helping push with its 2,000-lb. bomb.

A PETROL-PROOF FLEXIBLE TUBING AT LAST

An Invention of the Greatest Importance to Aviation

It is an old saying that a chain is only as strong as its weakest link. Similarly, the installation of an aircraft engine is only as reliable as its weakest spot. It is by now fairly well established, and accepted, that the modern aero engine is in itself a very reliable prime mover, and that what gives trouble is not so much the engine itself as its accessories and auxiliaries. If, therefore, we are to have any hopes of improvements in the aero-engine, from the point of view of reliability, it is to the improvement in auxiliaries that we should first turn. Among these one of the worst or at any rate quite a bad—and frequent—offender is the petrol system, with its piping and, particularly, its joints. Copper pipes have been used almost exclusively, but, incorporate "vibration bends" as one may, flexible joints have still proved to be necessary. Now, although rubber can be made *petrol-resisting*, it cannot at present be made *petrol-proof*. If, as has sometimes been done, benzole is mixed with the petrol, the rubber joints fare even worse. So much so that they can scarcely be called benzole-resisting, let alone benzole-proof.



THE BLAISDELL PETRO-FLEX TUBING: A petrol and benzole-proof flexible tubing made from animal gut and reinforced with an outer fabric cover and a spirally-wound wire protector. The special unions should be noted.

Obviously, if a really reliable *flexible* tubing could be produced, which would at the same time be petrol and benzole proof, a very great step would have been taken towards reliability in the fuel system. Such a tubing now appears to be available, and, according to exhaustive tests, promises to do all that can reasonably be expected of any tube. The new flexible tubing, which is known as Blaisdell Petro-Flex, is the invention (or should one say discovery?) of Mr. F. E. Blaisdell, who showed us the tubing in its original and somewhat crude form more than two years ago. At the time we considered the tubing very promising, and advised the inventor to continue his research work. This he has been doing, and the fact that the tubing has not been placed on the market until now is due to Mr. Blaisdell's policy that nothing short of perfection—as near as it is humanly attainable—was good enough for a petrol tube, on which so much depends in an aircraft.

The new tubing is manufactured and marketed by the Blaisdell Petro-Flex Tubing Co., Ltd., of Cassiobury Works,

St. Albans Road, Watford, Herts. Briefly it consists of an inner lining of animal gut, covered by an outer cover of fabric, the whole being strengthened by a wire wound around the tube in a spiral. The petrol proof qualities of the tubing are, of course, due to the inner lining of gut. In order to ensure that no minute pin-holes exist, the inner lining is composed of a number of layers of the gut, drawn over one another on a long mandrel. The layers are first well soaked in a special preparation, which makes them stick together and form a complete unit. When the inner tube is set sufficiently the outer fabric covering is put on and the tube is given the spiral groove, which forms the seating, so to speak, for the wire protector. The flatter projects beyond the exposed fabric, thus protecting it against abrasion as well as crushing.

The Union Terminals

Not the least interesting feature of the Blaisdell Petro-Flex is the union, which has been specially designed for the tubing, and takes the place of the usual binding-wire or hose clip, with its projecting bolt and nut. In the Blaisdell union there is a male portion in gunmetal which has on it a coarse right-hand thread corresponding to the spiral groove in the tubing itself. This portion is screwed into the tube, and is locked in position by means of a nut, so proportioned that it will just pass over the end of the tubing. This nut has a tapering left-hand thread, so that, as it is screwed down, it makes its own thread on the tubing, and, just before being screwed right home climbs on to the end of the wire spiral, thus further locking the joint. The rest of the union, as will be seen from the sketch, is a standard fitting attaching to the tank, etc., in the usual manner. The grip which is obtained is so strong that the tubing and union have successfully withstood a tension of over 200 lbs. without showing any signs of giving way.

Tests with petrol under pressure and vibration tests on the tubing have also, we understand, given excellent results, and altogether it appears to us that here at last is a really satisfactory petrol-proof tubing, eminently suitable for use on aircraft. It should be mentioned that the Blaisdell Petro-Flex is not only proof against petrol, but also against benzole, and, in short, all hydrocarbons. The tubing can be supplied in lengths of up to 15 ft. This represents the maximum length at the moment, owing to the decision of the makers not to use joints in the gut lining. For most aeroplanes such lengths should be sufficient, and doubtless in time, if the demand should exist, ways and means will be found for making satisfactory joints in the inner tube. As regards size, the tubing is manufactured in internal diameters ranging from ¾-in. to 2-in., so that there should be no difficulty in fitting any system likely to be met with. It might be argued that the flow in the pipes would be restricted by the internal corrugations. While this is probably so for high velocities, it is scarcely likely to have any appreciable effect at the rates of flow obtaining in a petrol supply system.

In conclusion it should be mentioned that the tubing can be supplied in short lengths to take the place of existing rubber joints, for cases where it is desired to maintain the metallic portion of the existing petrol system. Any further particulars will be supplied on demand by the Blaisdell Petro-Flex Tubing Co., Ltd., Cassiobury Works, St. Albans Road, Watford, Herts.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

CROYDON AVIATION MEETING, SEPTEMBER 17, 1921

List of Competitors

| Entrant. | Pilot. | Machine. | Engine. |
|-----------------------------------------------|-------------------------------------|----------------|--------------------------|
| Surrey. Flying Services | A. F. Muir | Avro 504K | 130-h.p. Clerget. |
| Vice-Admiral Mark Kerr, C.B., M.V.O. | Mark Kerr | B.E. 2e | 90-h.p. R.A.F. 1A. |
| A. S. Butler | A. S. Butler | Bristol Tourer | 240-h.p. Siddeley Puma. |
| G. de Havilland | G. de Havilland | D.H.6 | 90-h.p. R.A.F. 1A. |
| Brompton Motor Company | A. H. Dalton | D.H.6 | 80-h.p. Renault. |
| Aircraft Disposal Company | H. Shaw or M. W. Piercy | D.H.9a | 400-h.p. Liberty. |
| Surrey Flying Services | A. F. Muir | S.E.5a | 220-h.p. Wolseley Viper. |
| F. J. Ortweiler | F. J. Ortweiler | S.E.5a | 220-h.p. Wolseley Viper. |
| F. S. Cotton | F. S. Cotton | S.E.5a | 220-h.p. Wolseley Viper. |
| H. A. Petre | H. A. Petre | Avro 504K | 110-h.p. Le Rhone. |
| W. R. Bailey | W. R. Bailey | Avro 504K | 110-h.p. Le Rhone. |
| A. V. Roe | Lt.-Col. D. A. Spenser Grey, D.S.O. | Avro 504K | 110-h.p. Le Rhone. |
| Welsh Aviation Company | F. G. M. Sparks | Avro 548 | 80-h.p. Renault. |
| Oxfordshire Aviation Services | Maj. B. Ferrand, D.S.O., D.S.C. | Avro 504K | 110-h.p. Le Rhone. |
| Sq.-Leader G. H. Bowman, D.S.O., M.C., D.F.C. | G. H. Bowman | Sopwith Snipe | 200-h.p. B.R.2. |
| J. H. James | J. H. James | Sparrowhawk | 200-h.p. B.R.2. |

3.0 p.m. Club Handicap.—Prizes: 1st, £20; 2nd (if five starters), £10. For machines Avro type, engine power not exceeding 150 h.p. The race is over a distance of approximately 24 miles, being three laps of the course.

| Pilot. | Machine. | Engine. |
|--------------------|-----------|--------------------|
| D. A. Spenser Grey | Avro 504K | 110-h.p. Le Rhone. |
| A. F. Muir | Avro 504K | 130-h.p. Clerget. |
| H. A. Petre | Avro 504K | 110 h.p. Le Rhone. |
| F. G. M. Sparks | Avro 548 | 80 h.p. Renault. |
| W. R. Bailey | Avro 504K | 110-h.p. Le Rhone. |
| B. Ferrand | Avro 504K | 110-h.p. Le Rhone. |

3.30 p.m. First Waddon Handicap.—Prizes: 1st, £30; 2nd (if five starters), £10. For machines with a speed of not less than 100 miles per hour. The race is over a distance of approximately 24 miles, being three laps of the course.

| Pilot. | Machine. | Engine. |
|-----------------|---------------|--------------------------|
| F. J. Ortweiler | S.E.5a | 220-h.p. Wolseley Viper. |
| F. S. Cotton | S.E.5a | 220-h.p. Wolseley Viper. |
| A. F. Muir | S.E.5a | 220-h.p. Wolseley Viper. |
| G. H. Bowman | Sopwith Snipe | 200-h.p. B.R.2. |

Meteorology and Aviation

MAJOR-GENERAL SIR FREDERICK SYKES, Controller-General of Civil Aviation and Chairman of the British Meteorological Committee, presided at a lunch given by the Government on September 9 at the Carlton Hotel to the International Meteorological Committee and sub-committees, which are at present conferring in London. General Sykes emphasised the importance of international co-operation in meteorological matters. He said that he understood that of the four commissions which were meeting in London that which has the most difficult problems to discuss is the

| Pilot. | Machine. | Engine. |
|-------------------------|-------------|-------------------|
| H. Shaw or M. W. Piercy | D.H.9a | 400-h.p. Liberty. |
| J. H. James | Sparrowhawk | 200-h.p. B.R.2. |

4 o'clock. First Croydon Handicap. Prizes: 1st, £30; 2nd (if five starters), £10. For machines with a speed of less than 100 miles per hour. The race is over a distance of approximately 24 miles, being three laps of the course.

| Pilot. | Machine. | Engine. |
|--------------------|-----------|--------------------|
| A. H. Dalton | D.H.6 | 80 h.p. Renault. |
| A. F. Muir | Avro 504K | 130-h.p. Clerget. |
| H. A. Petre | Avro 504K | 110-h.p. Le Rhone. |
| W. R. Bailey | Avro 504K | 110-h.p. Le Rhone. |
| D. A. Spenser Grey | Avro 504K | 110-h.p. Le Rhone. |
| F. G. M. Sparks | Avro 548 | 80-h.p. Renault. |
| Mark Kerr | B.E.2e | 90-h.p. R.A.F. 1A. |
| B. Ferrand | Avro 504K | 110-h.p. Le Rhone. |
| G. de Havilland | D.H.6 | 90-h.p. R.A.F. 1A. |

4.45. First Autumn Handicap.—Prizes: 1st, £50; 2nd (if five starters), £20. For machines occupying the first three places in the Waddon and Croydon Handicaps. The race is over a distance of approximately 32 miles, being four laps of the course. For competitors occupying the first three places in the Waddon and Croydon Handicaps.

5.15. Air League Challenge Cup. (Presented by Major-General Sir Sefton Brancker, K.C.B., and Mr. Philip S. Foster).—Relay race for three teams of three pilots each.

| Red. | White. | Blue. |
|------------------------------------|---------------------------------------|-------------------|
| Flight-Lieut. J. M. Robb, D.F.C. | Major E. L. Foot, M.C. | Capt. A. F. Muir. |
| Flight-Lieut. R. W. Chappell, M.C. | Sq.-Leader G. H. Bowman, D.S.O., M.C. | F. J. Ortweiler. |
| Flying Officer P. Mur- gatrodyd | Major C. H. R. Johnstone, M.C. | F. S. Cotton. |

The race is over a distance of approximately 24 miles, being three laps of the course. One representative of each team will start together on S.E.5a machines. At the end of the first lap they will alight on the aerodrome, hand a baton to a second representative of each team, who will then fly the second lap in Avro machines. At the end of the second lap the second representatives of each team will alight on the aerodrome and hand the baton to the third representatives of each team, who will then fly the third lap in S.E.5a machines. On completing the third lap the machines will cross the finishing line in flight. The winning team will be the one whose representative, having properly completed the course, is the first to cross the finishing line.

6 p.m. Balloon Sniping Competition.—Three small balloons will be released at short intervals and immediately afterwards the machine will set off in pursuit. The machine will carry a passenger, whose object is to shoot down the balloons. An ordinary shot gun loaded with dust shot will be used. The competitor who destroys three balloons in the shortest time will be the winner. Each competitor will be allowed ten minutes to destroy the three balloons.

Course.—The course for each event is approximately 8 miles, the turning points being Waddon Aerodrome, a white cross on the ground near Purley Downs Golf Club, and Croydon Cement Works, Beddington.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W.1.
H. E. PERRIN, Secretary.

Commission for Weather Telegraphy. Civil Aviation has, he said, made new demands on the weather forecaster which could not be met by the old interchange of information, and wireless telegraphy brings with it its own difficulties. He wished Col. Sacconey's commission every success. Aviation and meteorology must go hand in hand. It is a mutual partnership, for aviation needs meteorology and meteorology needs aviation. General Sykes concluded by paying a warm tribute to the work of Sir Napier Shaw, and said that his work for England had been paralleled by the work done for France by Professor Angot.

LONDON TERMINAL AERODROME

Monday Evening, September 12

THE aerodrome has shared in the general excitement as to the arrival of Charlie Chaplin. On Friday night the entire place was illuminated for night-flying, as an aeroplane was expected with pictures of Chaplin's arrival at Cherbourg. Mr. Ortweiler, flying one of the De Havilland Aircraft Company's 9's, had left for St. Inglevert in the morning. At St. Inglevert he was to wait for a French machine which was bringing the photographs from Cherbourg, and he was not expected to arrive at Croydon until after dark. For the first time, apart from tests, the cone-light was working, and it looked extremely effective from a distance on the ground; but, owing to the non-arrival of the French machine at St. Inglevert, Mr. Ortweiler did not return to Croydon that night, and therefore the officials in charge of the lights did not get the interesting data that they were hoping for, and at 11.15 p.m. the order was given to "close down."

Night-Lighting Control

PRACTICALLY all this night-lighting is now controlled from the observation tower. Telephones have been run out to the searchlights, and the switches for the obstacle lights are concentrated in the tower. A wind-vane with an indicating dial has been installed so that the electric landing "T," sunk in the aerodrome, can be altered to conform to sudden changes in the wind. It is doubtful if any other aerodrome in the world is so well-equipped for night-flying.

On Saturday morning, Capt. Muir was off to Southampton as early as 7 a.m. in one of the Surrey Flying Service "Avros," and was back at Croydon, with photographs of Chaplin's arrival at Southampton, soon after 10 o'clock.

The Instone Line are in future to do their own parcels' collection and delivery. They are running a Ford van, which, in addition to handling the land end of the parcels' traffic, is also a good advertisement for the air line.

The D.H. 18's operated by the Instone Air Line have been flying on the Paris route with their usual regularity. G.E.A.R.O., which was one of the Aircraft Transport and Travel machines, must have flown more hours than any other machine on the "airways."

Mr. Hall, of Napier's, to whom much of the credit for the fine running of the D.H. 18's is due, has now got his own office on the aerodrome. He has rented an office in the hut belonging to Basil S. Foster's; but if there is a Napier engine anywhere about the 'drome, it is no use looking for Mr. Hall in his office. Where the engine is, there Mr. Hall is. He will have quite a busy time when the new D.H. 18's, the Bristol 10-seater, and the fleet of new D.H. monoplanes—all engined with the "Lion"—are housed at Croydon next spring.

Attempt on Paris-London Record

I HEAR that the Napier-engined "Mars I," the winner of the Aerial Derby, is to attempt to beat all records for the Paris to London Flight after competing for the Deutsch De La Meurthe Cup. With her pilot, Mr. James, she is to wait at Le Bourget for a strong favouring wind, and is then to attempt to do the Paris-London trip in under an hour. The best time, hitherto, between Le Bourget and Croydon is 1 hr. 27 mins. on a Napier-engined D.H. 16, while the D.H. 18 has done the journey, with a strong following wind, in 1 hr. 47 mins. It should be comparatively easy for a machine with the speed of the "Mars I" to do the journey in less than an hour if the right wind can be found. The only trouble is that Mr. James may have to wait a long time for that wind. Handley Page Transport have not yet got the W. 8 on the service, but are still expecting to do so any day now.

The airship mooring mast is being dismantled spasmodically. This week the water-ballast pipes to the top of the mast have been taken down; but little else appears to have been removed. The mooring head is still supported by sheer-legs, although after last night's storm it was fully expected that it would have been blown down.

Aeroplanes for Spain

QUITE a number of machines are being flown to Spain, both from the Disposal Company and from the Bristol Aeroplane Works. I understand that the Disposal Company alone have orders from the Spaniards for upwards of 100 machines, chiefly Bristol fighters and D.H. 4's. Mr. Tait-

Cox was back from Spain on Saturday morning to collect another machine.

Both the Aircraft Disposal Company, and the Bristol people, are having difficulty in finding pilots to ferry these machines across to Spain—the trouble being that so few pilots have been able to keep their hands in during the last two years.

Mr. Shaw, of Basil S. Foster's, has been testing some of these machines for Spain, and he is going to Liverpool by train to-night to fetch the first of a batch of D.H. 4's to Croydon for the Disposal Company. He tells me he is to fly a D.H. 4A in the races at Croydon on Saturday next.

The promoters of the air-races here on Saturday, the 17th, are expecting big crowds, but it is difficult to see how they are to be accommodated. Several temporary enclosures are to be arranged for, but the main trouble will be the lack of entrances and exits to and from the enclosures to the main road, and also the congestion in Plough Lane.

Balloon Shooting—The New Sport

ONE of the most interesting items is to be the "balloon sniping" competition. It is proposed that three balloons should be liberated at ½-minute intervals, and as the last balloon is sent up one of the competitors will start from the ground, conveying as passenger a man with a shot-gun, who will endeavour to "shoot" the balloons as the pilot manoeuvres his machine round them. Capt. de Havilland was at Croydon with a D.H. 9 the other day trying to catch one of the balloons used by the Meteorological Office for upper wind observations. These rise at 500 feet a minute, and Capt. De Havilland found it difficult to get near them. Gen. Brancker and Mr. Harold Perrin, who were watching this trial, were satisfied that the item would be exciting from a spectators' point of view. I understand that Capt. Muir has entered four Avros for the various races.

Mr. Duke had trouble with one of the magnetos on an outward-bound Fokker monoplane on Friday and was forced to land at Lympne, where he had to stay until a mechanic was sent from Croydon to put the trouble right. There are no mechanics at Lympne, and the only services that can be obtained there are unskilled. This is a wonderful testimony to the freedom from engine trouble of the machines on the various services, seeing that the Air Ministry evidently consider the likelihood of mechanical trouble too small to warrant the stationing of skilled men at Lympne.

Making More Use of Lympne

It has been suggested that a more extensive use could be made of Lympne during the winter months. At present, when a machine cannot get through to Croydon owing to bad weather, the pilot lands at Lympne and the passengers travel on to London by train; but no attempt has been made as yet to get passengers away from Lympne, for the Continent, when the weather over the Surrey Hills has been too bad to warrant a start being made from Croydon. I understand that something of this sort is under consideration for this winter by certain firms.

The new Fokker 10-seater monoplane has been tested at Schiphol and is, I hear, satisfactory. On one occasion, however, when only three passengers were aboard, the pilot appeared to have considerable difficulty in getting the monoplane down within the limits of the aerodrome, owing to the machine's very small gliding angle. In appearance the new machine is much like the F. 111.

During the week the traffic hands appeared in their new uniforms. These consist of jersey and slacks and a yachtsman's cap, the whole outfit being very neat. Unfortunately, the initials of the words "Civil Air Traffic Staff," which were embroidered in red letters on the chest of the jersey, were too mirth-provoking for the aerodrome humorists, and the "C.A.T.S." led a dog's life the first day. The powers-that-be, however, took pity on them, and allowed the offending letters to be removed the next morning, and now the uniform is adding to the general smartness of the aerodrome.

Joy-riding was very poor over the week-end. Capt. Muir was bemoaning the fact that on Sunday the only business he had was three ten-and-sixpenny joy-rides.

An aerodrome cricket team beat the Directorate of Lands by one wicket on the aerodrome ground on Sunday.

Good Work of an Avro

THE Queensland and Northern Territory Aerial Services, Ltd., have in use an Avro biplane, fitted with a Sunbeam "Dyak" engine. This machine has now flown 7,400 miles in 111 hours with 285 passengers at a cost of 4½d. per mile. Good pioneer work that.

Seaplane Dock Finished

THE seaplane floating dock laid down in November, 1920, has now been finished. Built in Sheerness Dockyard, it has a length of 143 ft. overall, and a width of 51 ft., with a lifting capacity of about 200 tons. The dock should have ample accommodation for two of our largest modern seaplanes,

NOTICES TO AIRMEN

Aerodromes for Civil Use: Amendments

NOTICE to Airmen No. 56 of 1921.

LIST B.—*Aerodromes available for Civil Machines in emergency only.*

The following should be deleted: Barlow (Airship), Barrow (Walney) (Airship), Houton Bay (S.), Kingsnorth (Airship). (No. 63 of 1921.)

Croydon Aerodrome: Aerial Pilotage Light

1. AN Aerial Pilotage Light has been established at the south-west corner of the London Terminal Aerodrome, Croydon, which, until further notice, will function in addition to the Aerial Lighthouse referred to in Notice to Airmen No. 99 of 1920.

2. This light exhibits a white group occulting light every 13 seconds, thus: Flash, 1 second; eclipse, 1 second; flash, 1 second; eclipse, 1 second; flash, 1 second; eclipse, 1 second; flash, 2 seconds; eclipse, 2 seconds; flash, 2 seconds; eclipse, 1 second.

3. This light consists of two separate units, i.e.:—

(a) An upper unit, showing three flashes, of 1 second's duration each, as above, visible at a distance of 25 miles.

(b) A lower unit, appearing as a triangular patch of light, exhibited during two periods of 2 seconds duration each, as above, visible at a distance of 12 miles.

4. For reasons of economy, this light will only be exhibited when due notice that a machine may arrive between sunset and sunrise has been given to the Civil Aviation Traffic Officer, Croydon.

(No. 64 of 1921.)

Belgium: Civil and Military Aerodromes

NOTICES to Airmen, No. 139 of 18th December, 1920, and No. 23 of 25th February, 1921, are amplified and amended as follows:—

(1) *Civil Aerodrome—Haren.*

Charges.—As from July 1, 1921, the regulations with respect to the conditions for the use of Belgian State aerodromes are being enforced at Haren, as far as housing and landing charges are concerned.

Accommodation.—A three-bay metal and concrete hangar, 216 ft. wide, with a width of entry of 68 ft. 3 ins., internal height 15 ft. 5 ins. and depth 72 ft. 2 ins., will be specially reserved for visiting and private machines.

Obstructions.—Certain work (ploughing, etc.) is in progress in the southern part of the ground. The danger area is

marked by white flags. It is advisable to land as near as possible to the white circle in the centre of the ground. (See plan in Notice to Airmen No. 139 of 1920.) The part of the ground suitable for landing is outlined with white marks, 3 metres in diameter and about 100 metres apart.

Markings.—The old name of the aerodrome "EVERE" is still marked on the roof of the large wooden hangar.

(2) *Military Aerodromes.*

(a) In addition to the conditions outlined in para. 4 (a) of Notice to Airmen No. 23 of 1921, it should be noted that, at a military aerodrome, only sufficient petrol may be supplied to a civil aircraft to enable it to reach the nearest civil aerodrome.

(b) *Auxiliary Military Aerodromes.*—In principle, no assistance should be expected at an auxiliary military aerodrome, because such aerodromes are frequently unoccupied.

The following auxiliary military aerodromes are available for landing under the above conditions.

Beverloo. Auxiliary Military Aerodrome.

Position.—Lat. 51° 7' N., Long. 5° 18' E. Situated 22 km. to the N. of Hasselt, 2½ km. E. of the railway station and village of Bourg Leopold; near Beverloo camp and south of the Hechtel road.

Description.—Grass and sand surface. Height (approx.) 200 ft. above sea level. Dimensions for landing, approximately 550 × 440 yds. The best ground for landing is on the west and north sides.

Brasschaet. Auxiliary Military Aerodrome.

Position.—Lat. 51° 20' N., Long. 4° 30' E. Situated 15 km. N.N.E. of Antwerp, 1 km. N.N.W. of the Brasschaet camp.

Description.—Dimensions for landing, approximately 490 × 330 yds. The best part for landing is the south end of the aerodrome. Height (approx.) 60 ft. above sea level.

Accommodation.—One metal hangar is available.

Elsenborn. Auxiliary Military Aerodrome.

Position.—Lat. 50° 28' N., Long. 6° 12' E., situated 13 km. E.N.E. of Malmédy, 2 km. N.W. of the village of Elsenborn.

Description.—Dimensions for landing (approx.) 220 × 270 yds. The best ground for landing is near the hangars. Height (approx.) 1,950 ft. The surrounding country is very hilly and wooded.

Accommodation.—One metal and concrete hangar is available.

(No. 65 of 1921.)

ROYAL AERONAUTICAL SOCIETY NOTICES



Lecture Programme.—In addition to the lectures previously announced, the Session will be opened by the following two papers:—

October 6: "Some Notes on Aeroplanes in Tropical Countries," by Air-Commodore H. R. M. Brooke-Popham.

October 20: "The Langley Machine and the Hammondsport Trials," by Mr. Griffith Brewer.

"R.38" Memorial Service.—The Society was represented at the Memorial Service in Westminster Abbey on September 7, to those lost in "R.38," by Major-General Sir R. M. Ruck, K.B.E., C.M.G., and the Secretary.

Journal.—The September number of the Aeronautical Journal, which is now available to non-members, price

2s. 6d., contains "Scientific Methods in Aeronautics," by G. I. Taylor, F.R.S., "Problem of Flapping Flight," by Herbert Chatley, D.Sc., The Second Annual Report of the Scottish Branch of the Society; as well as biographical notices of the following members:—Major-General Sir David Henderson, Air-Commodore E. M. Maitland, Mr. C. I. R. Campbell, Major G. H. Norman, Flight-Lieut. J. E. M. Pritchard, Mr. J. R. Pannell, and Lieut. C. G. Little, U.S. M.R.F.

Library.—The following books have been received and placed in the Library:—"Text-Book of Aerial Laws," by Henry Woodhouse, and "A Short History of the Royal Air Force," Air Ministry.

W. LOCKWOOD MARSH, Secretary.

7, Albemarle Street, W. 1.

Memorial to Capt. Ball, V.C.

On September 8 the national memorial to the late Captain Albert Ball, V.C., D.S.O., was unveiled by Air-Marshal Sir Hugh Trenchard in the grounds of Nottingham Castle. The ceremony was attended with military honours, and a squadron of R.A.F. machines from Grantham flew overhead. Sir Hugh Trenchard, in paying a tribute to the late pilot V.C., said that Captain Ball had taken part in no less than 200 air fights, and was known to have brought down 45 enemy machines. He was typical of the spirit of British youth, and by his life and death he illuminated English character.

The monument, the work of Mr. Henry Poole, A.R.A., consists of a Portland stone pedestal surmounted by a group in bronze. The figure of Captain Ball is depicted with upward gaze, buckling on his belt before a flight, and behind him is represented the air in the allegorical form of a woman, resting one hand on the young aviator's shoulder and with the other

pointing upwards to the sky. The ceremony was attended by a large gathering, including the parents and other members of Captain Ball's family. The parents placed at the foot of the statue a propeller formed of blue and white flowers.

The Gordon-Bennett Balloon Race

Lots have been drawn for the order of starting in the Gordon-Bennett balloon race which is to be flown on September 18 with fifteen balloons, representing five nations. In consequence the order of starting will be as follows: (1) Lieut.-Col. J. D. Dunville (Great Britain); (2) Bienaime (France); (3) Upson (U.S.); (4) Barbanti (Italy); (5) Magdalena (Spain); (6) Armbruster (Switzerland); (7) De Muyter (Belgium); (8) Henry Spencer (Great Britain); (9) Jules Dubois (France); (10) Van Orman (U.S.); (11) Valle (Italy); (12) Labrousse (Belgium); (13) Crombez (France); (14) Von Hoffman (U.S.); and (15) Uselli (Italy).

AIRISMS FROM THE FOUR WINDS.

MOTOR-CARS, especially in America, have figured largely in bathing arrangements and snappy costumes. But these must now be regarded as back numbers, as from France the latest thing in this direction is to reach the sea in full swimming kit, by way of the air. According to the report, the other day, the inhabitants of Cavalaire (Var), where the sight of an aeroplane is a sufficiently rare occurrence, were delighted to see a hydro-aeroplane (presumably an amphibian) land on the beach, and were considerably surprised when a bathing party descended from it, attired in bathing costumes, peignoirs, and caps. After the bathe the party again donned their peignoirs, stepped into the aeroplane, and were driven back to their estate some twenty miles inland.

ANTI-AIRCRAFT guns during the War have had some funny things booked to their debit, both against property and the person. Therefore it is but right that praise which is theirs should be rendered unto them. Thus it transpires that in the Church of St. Margaret, Lower Halstow, near Sittingbourne, a discovery of antiquarian interest has been the result of operating these aircraft strafers. It appears that during the War the concussion caused by the powerful anti-aircraft guns posted along the reaches of the Medway cracked the plaster round the basin of the font in Halstow Church. This was removed, and underneath was found a leaden font in splendid preservation, which has been established as being work of the 12th century. Moreover, it is suggested that, like other early leaden fonts in this country, the original is from the Continent, not to say Germany.

We have just received a set of six air post stamps used in the Memel zone of Allied occupation of Germany. These consist of the current French stamps overprinted "MEMEL," and with new values in pfennings and marks, further overprinted "FLUGPOST" in blue double-lined letters. The six values are 60 pf., 80 pf., 1 mk., 2 mk., 3 mk. and 4 mk.

Two other air post stamps to hand are from Latvia, or Lettland—one of the post-War republics of Russia. They are of triangular format, base upwards. The design is the same for both values (10 roubles, green, and 20 roubles, blue), and depicts a monoplane tightly wedged within the ornamental border-frame, at the top of which is the word "Latvijs," the value appearing in figures in the bottom angle.

LITHUANIA, another chunk of self-determined Russia, is also issuing three air post stamps. These, too, are triangular

in shape, and of 1, 3 and 5 aukinsas in value. The design represents an aeroplane flying over the capital city.

It appears that the Chinese air post stamps are now available, although we have not yet seen any over here. There are five denominations:—15, 30, 45, 60 and 90 cents.

FOR use in connection with the air mail service between Aleppo and Alexandretta, the following values of the French military occupation stamps of Syria were overprinted "Poste par avion" (in violet):—1 piastre on 5 c., 5 piastres on 15 c., and 10 piastres on 40 c. Owing to the small numbers of each type so overprinted, these stamps are likely to fetch high prices.

THE Portuguese colony of Macao will probably issue specially overprinted stamps for use in connection with aerial mail services established in this colony.

APPARENTLY the French are alive to the possibilities of seaplanes and amphibians in shortening the Paris-London air-journey, as a newspaper correspondent states that a service is to be inaugurated under French auspices to try the thing out, Caudron machines being mentioned in this connection. Wonder how the undertaking will get on with our Port of London authorities!

Mlle. ADRIENNE BOLLAND, who during her stay in South America flew over the Andes, is returning to Buenos Ayres next week as the accredited air representative of the French Government. Mlle. Bolland will be attached to the Staff of the French Legation in Argentina.

COL. LOCKWOOD MARSH, the Secretary of the Royal Aeronautical Society, has promptly taken up the idea of Sir Charles Bright in regard to an airship lecture. Speaking on his own account and without pledging the Council of the Society, many of whom are away, Col. Marsh suggests an extension of the Maitland lecture. He writes: "I personally feel that if such a scheme is undertaken Air-Commodore Maitland himself would have wished that with his name should be associated those of the others who were lost in the airship. I suggest that there should be coupled with their names those of Wing-Commander C. M. Waterlow and Wing-Commander Neville Usborne, who were both killed accidentally during the War while engaged on airship work, in which they were two of the earliest pioneers in this country."

The Holder of the Michelin Cup: The Caudron C.60, on which Poiree made his flight, described in *FLIGHT* last week. This machine, which is one of the Caudron school types, can if desired be fitted with dual control. It is similar to the machine flown by Poiree at Monaco, except that wheels are fitted instead of floats. The engine is a 130 h.p. Clerget, and the main characteristics are as follows: Length over all, 24 ft. 7 ins. Span, upper plane, 33 ft. 4 ins. Span, lower plane, 31 ft. 4 ins. Wing area, 270 sq. ft. Weight empty, 1,110 lbs. Weight fully loaded, 1,900 lbs.



THE ROYAL AIR FORCE

London Gazette, August 30

Flying Branch.

The following relinquish their temporary comms. on return to Army duty :—
Flight Lieut. C. Y. McDonald, A.F.C. (Capt., Seaforth Hldrs.); Aug. 15. Flying Officer F. H. Bowyer (Lieut., Queen's Own Royal Regt.); Aug. 1. Observer Officer D. Wills (Lieut., Northants Regt.) relinquishes his temporary commn., having resigned his commn. in Army; Aug. 31.

Administrative Branch.

The following Flying Officers relinquish their temporary comms. on return to Army duty :—L. (E.) Cording, M.C., M.M. (Lieut., Rifle Brigade); Aug. 12. B. D. Frost (Lieut., Essex Regt.); Aug. 11. *Gazette*, June 24, 1919, concerning Lieut. (Hon. Capt.) H. G. White, is cancelled.

Medical Branch.

Flight Lieut. H. J. Swan, M.B., relinquishes his temporary commn. on ceasing to be employed, and is permitted to retain rank of Capt.; July 11.

Erratum.

Gazette, Aug. 23, for Shearer read Shearing.

London Gazette, Sept. 2

Permanent Commissions

Group Capt. H. P. Smyth-Osborne, C.M.G., relinquishes the appt. of Dep.-Dir., Air Ministry; Aug. 1, 1919.

Chaplains' Branch

The Rev. S. L. Clarke, M.A., B.Sc., is granted relative rank of Group Capt. for the purposes of precedence, administration and discipline; Sept. 2.

Flying Branch

Lieut. W. V. Hyde is transferred to the unempld. list; Nov. 11, 1919 (substituted for the notification in *Gazette* of Nov. 28, 1919).

London Gazette, Sept. 6

Short Service Commissions

The following are granted short service comms. as Pilot Offrs. on probation, with effect from, and with seny. of, Aug. 29 :—H. A. Bayne, *N. M. French, H. P. L. Gardner, A. E. Golds, F. L. Hudson, B. J. J. Nimmo, *R. H. Windsor. (*Previously served in R.A.F.)

Flying Offr. J. H. W. Goodall resigns his commn.; Sept. 7.

Flying Branch

Obsvr. Offr. H. J. Whiting, M.C. (Lieut. R.F.A.) relinquishes his temp. commn. on return to Army duty; Aug. 5.

Administrative Branch

Wing Comdr. G. Hilton, D.C.M. (Maj. K.O.S.B.), relinquishes his temp. commn. on retirement from Army; Sept. 7.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments are notified :—

Flight-Lieut. H. L. Crichton, M.B.E., to Mesopotamian Group Headquarters (Middle East Area) on ceasing to be attached Aircraft Park, Mesopotamia. 28.6.21.

Flight-Lieut. R. T. Nevill from No. 45 Squadron (Middle East Area) to No. 47 Squadron (Middle East Area). 11.7.21.

Wing-Comdr. A. D. Cunningham, C.B.E., from Air Ministry to command R.A.F. Airship Base (Coastal Area). 26.8.21.

Sqdn.-Ldr. G. S. Trewin, A.F.C., from Seaplane Training School (Coastal Area) to No. 10 Group Headquarters (Coastal Area). 1.9.21.

Sqdn.-Ldr. A. C. Winter, O.B.E., from Air Ministry to No. 24 Squadron (Inland Area). 5.9.21.

Sqdn.-Ldr. R. B. Ward, A.F.C., from Half-pay List to No. 29 Group Headquarters (Coastal Area). 21.9.21.

Sqdn.-Ldr. F. G. D. Hards, D.S.C., D.F.C., from No. 230 Squadron (Coastal Area) to R.A.F. Depôt (Inland Area). 27.9.21.

Sqdn.-Ldr. A. G. R. Garrod, M.C., D.F.C., from No. 29 Group Headquarters (Coastal Area) to R.A.F. Depôt (Inland Area). 27.9.21.

Flight-Lieut. D. W. Clappen from R.A.F. Depôt (Inland Area) to Central Flying School (Inland Area). 15.9.21.

Flight-Lieut. G. E. Livock, D.F.C., from No. 10 Group Headquarters (Coastal Area) to No. 230 Squadron (Coastal Area). 15.9.21.

N.C.O. Pilots Re-introduced

THE Air Ministry announces that it has been decided to establish shortly, as part of the peace-time organisation of the Royal Air Force, a class of N.C.O. pilots.

During the latter part of the War a similar class was introduced, but so far under peace conditions all piloting duties have been carried out by permanent and temporary Air Force officers.

Twice a year Officers Commanding Areas and Independent Commands are authorised to put forward a limited list of N.C.Os. and other airmen whom they consider suitable for duty as N.C.O. pilots. The first list will be forwarded on October 1st. A high standard of educational and general efficiency has been laid down for qualification; candidates will also have to show that they possess in a high degree the qualities of pluck, reliability, alertness, steadiness, keenness and energy. They will also have to satisfy the aviation candidates' Medical Board as to physical fitness.

Candidates will be drawn from serving non-commissioned officers and other airmen and will not be specially recruited with a promise of being trained as N.C.O. pilots. They must not be above the age of 25 at the time of recommendation, and will not be eligible for recommendation unless they hold the rank of leading aircraftsman. Preference will be given to men qualified as aerial gunners.

Selected volunteers must undertake to serve at least 5 years' regular service from the date of commencing training for pilot's duties, and during this period they will not be allowed to obtain discharge by purchase.

During the period of training they will receive a special allowance of 2s. per day in addition to their ordinary pay. On qualification they will be promoted to the rank of sergeant-

Flight-Lieut. A. McRitchie Moffat from R.A.F. Recruiting Depôt, Glasgow, to R.A.F. Recruiting Depôt, London. 1.9.21.

Flight-Lieut. C. G. Hetherington, M.B.E., from No. 7 Group Headquarters (Inland Area) to No. 6 Flying Training School (Inland Area). 10.9.21.

Flight-Lieut. L. H. Slater, O.B.E., D.S.C., D.F.C., to R.A.F. Base (No. 205 Squadron, Coastal Area) on ceasing to be attached School of Military Administration. 16.8.21.

Flight-Lieut. G. H. Warner from Aeroplane Experimental Establishment (Inland Area) to Headquarters No. 11 (I) Wing. 3.9.21 to 22.10.21.

Flight-Lieut. O. S. L. Campion from Aviation Candidates and Central Medical Board (Inland Area) to R.A.F. Depôt (Inland Area). 24.8.21.

Flight-Lieut. B. A. Malet, D.F.C., from Seaplane Training School (Coastal Area) to No. 10 Group Headquarters (Coastal Area). 1.9.21.

Flight-Lieut. G. Barrett. The notification, dated 12.8.21, wherein this officer was posted from Central Flying School to School of Photography, with effect from 15.8.21, is cancelled.

Flight-Lieut. F. W. Trott, O.B.E., M.C., from No. 24 Squadron (Inland Area) to Air Ministry. 29.8.21.

Flight-Lieut. C. Hanson-Abbott, from School of Naval Co-operation and Aerial Navigation (Coastal Area) to No. 230 Squadron (Coastal Area). 2.9.21.

pilot with the right to wear "wings," and will receive the following rates of pay according to the trade group from which they have come :—

| | Group I. | | | Group II. | | | Group III. | | |
|---------------------------|----------|----|--|-----------|----|--|------------|----|--|
| | s. | d. | | s. | d. | | s. | d. | |
| On qualification.. .. | 12 | 6 | | 11 | 6 | | 10 | 0 | |
| After three years | 13 | 6 | | 12 | 6 | | 11 | 0 | |
| Flight sergeant-pilots .. | 15 | 0 | | 13 | 6 | | 12 | 0 | |
| Ditto (over 3 years) .. | 15 | 6 | | 14 | 0 | | 12 | 6 | |

They will be posted to the establishment of a squadron and employed on full flying duties.

Pilots trained under this scheme will be eligible to extend their service or to re-engage to complete time for pension, but on completion of their flying service they will revert from flying duties to the trade they held before qualifying as N.C.O. pilots.

Entry of Boys into the Royal Air Force

A CONTINGENT of some 500 boys left King's Cross on Saturday last, for the R.A.F. School of Technical Training for Boys at Cranwell, Lincs.

These boys are being entered for a three years' course of training as skilled mechanics in the Royal Air Force. All of them have passed a qualifying examination in school subjects, some in an open competition test conducted half-yearly by the Civil Service Commissioners; others, who are in the majority, in a test held by the Air Ministry and confined to boys nominated as specially suitable in regard to character, educational standard, physical fitness and bent of mind by the Local Education authority of their district.

The test recently conducted by the Air Ministry was held at some 300 centres throughout the country and attended by some 800 candidates.

A Sign of the Times

In our advertisement pages of this issue of FLIGHT will be found one which is of more than ordinary interest, inasmuch as it shows, amidst the general depression at present obtaining in all industries, that the aircraft industry is not in such a bad way, after all. We refer to the announcement of the Fairey Aviation Co., Ltd., of Hayes, Middlesex, that they have vacancies for a number of engineering draughtsmen. If any proof were needed that, as regards this firm, at any rate, things are not so black as they are painted by pessimists, it is amply provided by this announcement. We have been told the exact number required, and it is such as to give some indication of the amount of work which is contemplated. By putting two and two together, it is not difficult to estimate that the work which the present drawing-office staff, plus the new draughtsmen to be taken on, will produce will later result in a call for workshop hands of all descriptions. Getting out the drawings is naturally the first operation, before actual construction is begun. There is now a good opportunity for those draughtsmen who have been writing to us for advice on positions. It should be kept in mind, however, that the Fairey standard is very high, and that without good previous experience it is little use to apply.

London-Paris Air Mail Twice Daily

THE Postmaster-General announces that, in extension of the facilities already provided for the acceptance at certain Post Offices of parcels for transmission to Paris by aeroplanes of the Instone Line, arrangements have been made for a second dispatch of air postal parcels on and from September 1, and until further notice, by Messrs. Handley Page's daily aeroplane service to Paris, leaving Croydon aerodrome at 12.30 p.m. The new dispatch will enable air parcels for Paris to be posted at certain Post Offices in London on the morning of dispatch up till the times shown below:—

Office and latest time of posting for second air parcel dispatch :—General Post Office, London, 9.40 a.m.; Lombard Street Branch Office, 9.10 a.m.; Western Central District Office, 9.55 a.m.; Charing Cross Branch Office, 10.25 a.m.; South-Eastern District Office, 9 a.m.; Croydon Head Post Office, 10.40 a.m. The question of providing still later facilities for posting at these and certain other offices in London is receiving consideration.

The new dispatch will also enable air parcels to be posted at certain provincial towns up till a later hour over night than is at present possible, if connection is to be made with the existing dispatch. Particulars will be made public locally.

Delivery should normally be effected in*Paris on the day of dispatch from London by either service.

Lithuanian 'Planes in Trouble

On August 30 from Warsaw it was reported that a few days previously three Lithuanian aeroplanes appeared over Vilna territory, and had thereby broken the Armistice. They were fired on by Zeligowski's troops, and aeroplanes went up to attack them, with the result that two Lithuanian planes were compelled to land in the territory of Central Lithuania. The pilots were released on condition that they would not fight against Zeligowski's troops.

Since then the Lithuanian Government has issued the following *communiqué* upon the matter:—"On the morning of the 27th ult, two air mechanics took possession of two aeroplanes and flew to Vilna. They have not since returned. A subsequent official enquiry established the fact that the two men had been in communication both with Warsaw and the Polish liaison officers of the League of Nations Control Commission. The aeroplanes carried no arms. The men have evidently landed in Vilna. The Lithuanian Government has applied, through the League of Nations Control Commission, for the restoration of the two aeroplanes and the surrender of the offenders."

A Missing Engine

An engine and parts of an aeroplane have been brought up by the trawler "Blucher" when fishing off Dover. The plate on the wreckage is inscribed "W.D. engine No. 24333."

Gordon Shephard Memorial Essay Prizes

THE Royal Air Force announces that the awards in the Gordon Shephard Memorial Essay Prizes for the year 1920 are as follows:—(1) Essay in the form of a lecture on cross-country and overseas flying by a pilot flying solo: No 1st prize; 2nd prize (value £5), Flying Officer R. P. M. Whitham, M.C., Headquarters R.A.F., Middle East, Cairo, Egypt. (2) Essay on an investigation of the possibilities attaching to aerial co-operation with survey, map-making and exploring expeditions: 1st prize (value £30), Sqdn.-Ldr. P. R. Burchall, O.B.E., R.A. Depot, Uxbridge; 2nd prize (value £5), Sqdn.-Ldr. B. E. Smythies, D.F.C., Headquarters R.A.F., India.

SIDE-WIND

In spite of the fire at their works recently, Titanine, Ltd., are "delivering the goods." A big order was shipped for a foreign Government recently, and by way of indicating the range of conditions met by Titanine dope, it may be mentioned that the "Avro Baby" seaplane which Sir Ernest Shackleton is taking with him to the Antarctic is doped with the "Titanine Silver Scheme." It therefore appears that Titanine will have the distinction of being "farthest south." On October 1 Titanine will be shown to the French on the "Mars I," entered for the Deutsch de la Meurthe Cup by the Gloucestershire Aircraft Co., Ltd. This machine is to be coated with "Titanine Special Racing Scheme," which gives a very high gloss and therefore may be expected to add another few miles to the already high speed of the "Mars I."

IMPORTS AND EXPORTS, 1920-1921

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; and for 1920, see "FLIGHT" for January 13, 1921.

| | Imports | | Exports | | Re-Exportation | |
|----------|----------------|---------------|------------------|------------------|----------------|--------------|
| | 1920. | 1921. | 1920. | 1921. | 1920. | 1921. |
| Jan. ... | £ 2,323 | £ 4,459 | £ 32,752 | £ 87,128 | £ 697 | £ 2,285 |
| Feb. ... | 9,320 | 2,379 | 68,932 | 59,829 | — | 19 |
| Mar. ... | 2,092 | 14 | 67,600 | 118,199 | — | 1,565 |
| April... | 5,918 | 1,370 | 148,484 | 138,983 | — | 450 |
| May ... | 761,425 | 3,350 | 237,627 | 59,624 | 400 | 1,818 |
| June ... | 491 | 5,181 | 300,572 | 79,713 | 61,150 | — |
| July ... | 51,020 | 540 | 286,646 | 530,628 | — | 850 |
| August | 116 | 343 | 130,774 | 111,595 | 2,544 | — |
| | <u>832,705</u> | <u>17,636</u> | <u>1,273,387</u> | <u>1,185,699</u> | <u>64,791</u> | <u>6,997</u> |

Artists Wanted.

ARTISTS used to rapid freehand sketching of car, chassis and mechanical details are required for several weeks in connection with the forthcoming Olympia Motor Show. Applicants should apply to the Editor of the AUTO., 36, Great Queen Street, Kingsway, W.C. 2.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages iii and xiv).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

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| 3 Months, Post Free.... | 7 | 7 | 3 Months, Post Free.... | 8 | 3 |
| 6 " " " " | 15 | 2 | 6 " " " " | 16 | 6 |
| 12 " " " " | 30 | 4 | 12 " " " " | 33 | 0 |

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* European subscriptions must be remitted in British currency

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